line and *a b* a line at zero pressure. The compression of the air takes place along *c d* and delivery along *d e.* The equalization of pressure now causes the pressure to fall along the line *ef,* and the new volume taken in on the next suction stroke is represented by the length *a b.* The pressure rises at *c* due to the air coming over from the other end of the cylinder in the manner described. Without such an arrangement the clearance volume would have

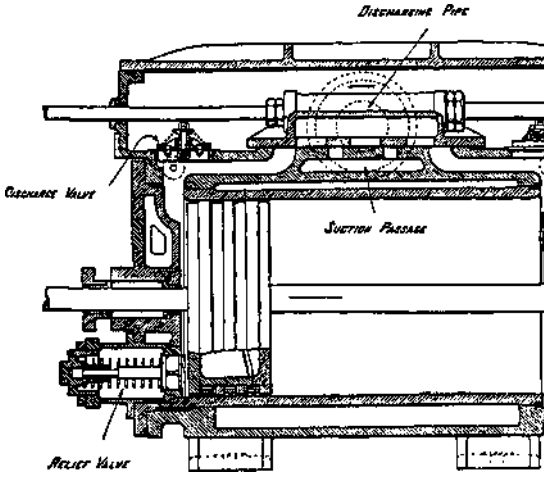
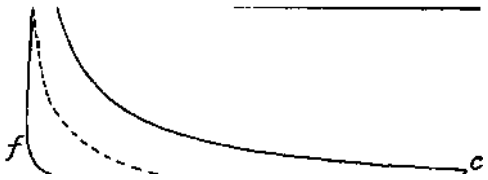


Fig. 19.—Horizontal Dry Air-pump

caused re-expansion along the dotted line *e h,* and the new volume drawn in would only have been represented by the length *h b.* It is obvious, then, that the equalization of pressure at the ends of the stroke nearly neutralizes the effect of clearance on the volumetric efficiency.

Air-pump Capacity.—The capacity of a reciprocating air-pump depends not only upon the displacement of the buckets, but also upon the volumetric efficiency. With



surface condensers and steam turbines working at normal full load and under fair

Fig. 20.—Indicator Diagram from Air-pump

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ed. The higher the vacuum, however, the greater is the necessary displacement of the pump. This cannot always be obtained by increasing the speed of the pump, because the volumetric efficiency tends to fall off at high speeds. Professor Weighton's* experiments suggest that with a fairly air-tight system a suction capacity greater than 07 c. ft. per pound of steam condensed has very little effect on the

* "The Efficiency of Surface Condensers

", *Institution of Naval, Architects*
1906.
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